Claims

[c1] A cutter for a web which comprises:
a web transport system that operates cyclically to advance the web, the web transport system providing a synchronization signal at a known point in a cutting cycle;
a drive system coupled to a cutting knife, the drive system oscillating the cutting knife from a resting position to an active position and back to the resting position in response to an actuating signal;
a sensor in the path of the cutting knife, the sensor providing a position signal when the cutting knife is at a predetermined position that is substantially different than the resting position; and
a controller coupled to the web transport system, the drive system, and the sensor, the controller receiving the synchronization signal, providing the actuating signal at a time relative to the synchronization signal, receiving the position signal, and adjusting subsequent actuating signals in response to the position signal so that the cutting knife arrives at the predetermined position substantially at a predetermined point in the cutting cycle.

[c2] The cutter as recited in claim [c1], wherein the synchronization signal allows the phase within the cutting cycle to be determined.

[c3] The cutter as recited in claim [c1], wherein the drive system includes a pneumatic actuator.

[c4] The cutter as recited in claim [c1], wherein the drive system includes a hydraulic actuator.

[c5] The cutter as recited in claim [c1], wherein the predetermined position is substantially at a position where the cutting knife is in contact with the web prior to cutting the web.

[c6] The cutter as recited in claim [c1], wherein the web transport system includes a clamp to hold the web adjacent to the cutting knife while the web is being cut.

[c7] The cutter as recited in claim [c6], wherein the drive system is supported by the clamp such that the cutting knife is moved toward the web when the clamp

holds the web.

[c8] A controller for a web cutter which comprises:
a synchronization circuit to receive a synchronization signal from a web transport system that operates cyclically to advance a web, the synchronization signal providing a known point in each cutting cycle;
an actuating circuit to provide an actuating signal to a drive system to cause the drive system to oscillate a cutting knife from a resting position to an active position and back to the resting position;
a position sensing circuit to receive a position signal from a sensor when the cutting knife is at a predetermined position that is substantially different than the resting position; and
an adjusting circuit coupled to the synchronization circuit, the position sensing circuit, and the actuating circuit, the adjusting circuit causing the actuating circuit to provide subsequent actuating signals so that the cutting knife arrives at the predetermined position at a predetermined time relative to the synchronization signal.

[c9] The controller for the web cutter as recited in claim [c8], wherein the adjusting circuit provides a delay time between the receiving of the synchronization signal and the providing of the actuating signal, and adjusts the delay time to provide subsequent actuating signals so that the cutting knife arrives at the predetermined position at a predetermined time relative to the synchronization signal.

[c10] The controller for the web cutter as recited in claim [c8], wherein the synchronization signal allows the phase within the cutting cycle to be determined.

[c11] The controller for the web cutter as recited in claim [c10], wherein the adjusting circuit provides a target value for the synchronization signal and causes the actuating signal to be provided when the synchronization signal equals the target value, and adjusts the target value to provide subsequent actuating signals so that the cutting knife arrives at the predetermined position at a predetermined time relative to the synchronization signal.

[c12] The controller for the web cutter as recited in claim [c11], wherein the adjusting circuit compares the synchronization signal to a goal value when the position signal is received to adjust the target value accordingly.

[c13] The controller for the web cutter as recited in claim [c8], wherein the predetermined position is substantially at a position where the cutting knife is in contact with the web prior to cutting the web.

[c14] A method of cutting a web which comprises:
advancing a web of material past a cutting knife;
receiving a synchronization signal to provide a known point in each advancing of the web;
providing an actuating signal to cause a drive system to oscillate the cutting knife from a resting position to an active position and back to the resting position;
receiving a position signal when the cutting knife is at a predetermined position that is substantially different than the resting position; and
adjusting subsequent actuating signals so that the cutting knife arrives at the predetermined position at a predetermined time relative to the synchronization signal, the adjusting of subsequent actuating signals being responsive to the position signal.

[c15] The method of cutting the web as recited in claim [c14], further comprising providing a delay time between the receiving of the synchronization signal and the providing of the actuating signal, wherein adjusting subsequent actuating signals includes adjusting the delay time.

[c16] The method of cutting the web as recited in claim [c14], wherein the synchronization signal allows the phase within the cutting cycle to be determined.

[c17] The method of cutting the web as recited in claim [c16], wherein the adjusting circuit provides a target value for the synchronization signal and causes the actuating signal to be provided when the synchronization signal equals the target value, and adjusts the target value to provide subsequent actuating

signals so that the cutting knife arrives at the predetermined position at a predetermined time relative to the synchronization signal.

[c18] The method of cutting the web as recited in claim [c17], wherein the adjusting circuit compares the synchronization signal to a goal value when the position signal is received to adjust the target value accordingly.

[c19] The method of cutting the web as recited in claim [c14], wherein the predetermined position is substantially at a position where the cutting knife is in contact with the web prior to cutting the web.

[c20] A cutter for a web which comprises:
means for advancing a web of material past a cutting knife;
means for receiving a synchronization signal to provide a known point in each advancing of the web;
means for providing an actuating signal to cause a drive system to oscillate the cutting knife from a resting position to an active position and back to the resting position;
means for receiving a position signal when the cutting knife is at a predetermined position that is substantially different than the resting position; and
means for adjusting subsequent actuating signals so that the cutting knife arrives at the predetermined position at a predetermined time relative to the synchronization signal, the adjusting of subsequent actuating signals being responsive to the position signal.

[c21] The cutter as recited in claim [c20], further comprising means for providing a delay time between the receiving of the synchronization signal and the providing of the actuating signal, wherein the means for adjusting subsequent actuating signals is further for adjusting the delay time.

[c22] The cutter as recited in claim [c20], wherein the synchronization signal allows the phase within the cutting cycle to be determined.

[c23] The cutter as recited in claim [c22], further comprising means for comparing the synchronization signal and a target value, wherein the means for providing an

actuating signal operates when the synchronization signal is equal to the target value, and the means for adjusting subsequent actuating signals is further for adjusting the target value.

[c24] The cutter as recited in claim [c23], further comprising means for comparing the synchronization signal to a goal value when the position signal is received to adjust the target value accordingly.

[c25] The cutter as recited in claim [c24], wherein the predetermined position is substantially at a position where the cutting knife is in contact with the web prior to cutting the web.